

## ABSTRACT

A method of reducing copper hillocks in copper metallization is described. An opening is made through a dielectric layer overlying a substrate on a wafer. A copper layer is formed overlying the dielectric layer and completely filling the opening. The copper layer is polished back to leave the copper layer only within the opening. Copper hillocks are reduced by applying F ions to the copper layer to form a buffer zone on a surface of the copper layer and in-situ depositing a capping layer overlying the copper layer. The F ions remove copper oxide naturally formed on the copper surface and the buffer zone transfers thermal vertical strain in the copper to horizontal strain thereby preventing formation of copper hillocks.